

**SYSTEM AND METHOD FOR COLLECTING AND REPRESENTING  
KNOWLEDGE USING TASK-METHOD-KNOWLEDGE WITH  
STRUCTURE-BEHAVIOR-FUNCTION IN A COMPUTER SYSTEM**

**Background**

This invention was made with Government support under contract DAAH01-01-C-R050 awarded by the U.S. Army Aviation and Missile Command. The Government has certain rights in the invention.

The present invention relates generally to the use of computer-based knowledge acquisition systems, and specifically to the gathering, representing, and processing of knowledge.

Artificial intelligence has long been a goal for those who design and develop computer systems. The development of such intelligence is directed toward designing systems which "think". It is hoped that thinking systems will be able to adapt to new situations, new problems, and new forms of input. For example, one goal of artificial intelligence is to solve problems by providing previously unanticipated solutions.

Under the broad umbrella of artificial intelligence, two main approaches have developed. The first approach, known as machine learning, is directed to developing computer systems with the ability to acquire knowledge on their own from observations or through instruction. The second approach, known as knowledge acquisition, is directed to developing computer systems in which the computers are "expert" in some area. This approach includes drawing knowledge from experts, encoding this knowledge from use in a computer system, and providing software programs which use the encoded knowledge to develop solutions. Knowledge acquisition systems are generally developed using the combined effort of knowledge engineers and software engineers. The knowledge engineers and software engineers interview experts to gain knowledge, capture the knowledge, and encode the knowledge in a computer-usable format. Software may then be developed to utilize the encoded knowledge. This development process is

Claim 1 is now amended to address the Examiner's objections. Limitations from claim 3 have been incorporated into claim 1, as will be explained.

The "software" is now specifically recited as being recorded on a computer-readable medium.

Throughout the claims, SBF and TMK no longer appear as abbreviations.

More specifically, claim 1 has now been amended to further distinguish if from Goel et al by reciting that "the processing further comprises using a tasks-method-knowledge hierarchy and encoding the input parameter and the output parameter using a structure-behavior-function model which is collected from the user". As such, the "behavior" part of the SBF processing is in fact a separate TMK hierarchy. That is to say, the behavior part of the input parameter is a knowledge system itself, having the whole power of the TMK hierarchy processing available to its behavior processing.

The combination of TMK within SBF within TMK, etc., is not taught nor suggested, nor motivated by Goel. Goel describes the behaviors of SBF as processing functions. The claims have been amended to clearly state that the behaviors are themselves TMK hierarchies with SBF input and output parameters.

Important and unique aspects of the Applicants invention are:

- Knowledge "acquisition", that is, the knowledge is collected from a user, either as SBF or TMK. The cited prior art are all "processing" of knowledge.
- Acquisition from the user, in a sense - interactive with processing, that is, if the processing determines that a method is not available, processing halts while a model is collected from the user, after which the processing continues. None of the cited prior art stops processing to collect additional knowledge.